

SUPPLEMENTAL NOTES ON *RHYNCHOSPORA*  
*CRINIPES* AND RELATED SPECIES  
IN SECTION *FUSCAE* (CYPERACEAE)

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ABSTRACT

*Rhynchospora crinipes* Gale and related species are considered as to sectional disposition, taxonomic relationships, geography and ecology. New distributional information is added.

RESUMEN

Se consideran *Rhynchospora crinipes* Gale y las especies próximas en cuanto a su disposición seccional, relaciones taxonómicas, geografía y ecología. Se añade información nueva de su distribución.

INTRODUCTION

Until recently, *Rhynchospora crinipes* Gale has been one of the least known of native beakrushes, all knowledge of it being confined to Gale's description and illustrations (1944: 173, & pl. 823, figs. 2A, 2B) of two specimens on deposit at the U.S. National Herbarium. Somewhat later G. Kükenthal (1950: 106) in his revision of the the "fuscae," still with only these two specimens to go on, recognized the taxon but at a reduced rank, treating it as a variety of *R. filifolia*. Both specimens were collected in June 1868 by Dr. Charles Mohr from the vicinity of Mobile, Alabama. Over the ensuing years many botanists, myself included, searched in vain to relocate Mohr's distinctive plant, particularly since no one knowledgeable working in the genus doubted the morphologic distinctness of the taxon, whatever their judgement as to its appropriate nomenclatural rank.

Reasons for difficulty in finding *R. crinipes* are plain enough. Mohr's label information is scanty and at the same time somewhat misleading. The holotype label reads "ditches, borders of ponds, June 1868," that on the paratype "low but dry places, roadsides (exsiccated), June 1868." This information, while adequate to describe habitat for most *Rhynchospora* known from the Mobile area, provides no lead to the very specialized habitat of *R. crinipes*. It remained for Dr. Loran C. Anderson (1988) to do this in his excellent article, which is the first authentic report of the continued existence of *R. crinipes*. In it he notes finding, during botanical expeditions by



canoe in the summers of 1987 and 1988, several viable populations from within the Big Coldwater drainage in Santa Rosa County, northwestern Florida. Big Coldwater Creek is one of the finer examples of a pristine blackwater stream in the Gulf South and he describes it very well. Since such streams are not rare in both the Atlantic and Gulf Coastal Plain, other botanists, armed for the first time on where precisely to look, have succeeded in finding this plant over a five-state area. More information on such discoveries will be given under *R. crinipes* in the treatment below.

This particular work is intended to bring recent fieldwork and studies on *Rhynchospora crinipes* into a taxonomic and ecologic context, in hope that it would serve as an aid to conservation of a rare species and its unique habitat. Thus, below, is a synoptical treatment of *Rhynchospora crinipes* and related North American species in the Section *Fuscae*.

#### TAXONOMY

The two outstanding students of *Rhynchospora* in recent years remain Dr. Shirley Gale for her 1944 revision of "Eurhynchospora" (now treated as subgenus *Rhynchospora*) and Dr. Georg Kükenthal for his revisional studies of the entire genus (1949, 1950). Of particular interest, I think, is the fact that neither had much if any field experience with *Rhynchospora*, their remarkable effort coming instead from a careful study of herbarium material. Their taxonomy can scarcely be improved on by those who are accustomed to study these plants in the field. Their work is made even more useful simply because both were so consistent in their concepts of species and so willing to express doubt when doubt was justified.

Of the two, the more conservative in assigning specific rank appears to have been Dr. Kükenthal, perhaps because of his having to do the genus worldwide. This difference also shows up as to how complexes of species should be ranked. Gale (l.c.) broke what was then treated as Section *Eurhynchospora* of Subgenus *Distylis* into 12 "series" basing these largely on what previous workers such as C.B. Clarke, J.K. Small, etc. had designated as sections, in some cases simply reducing them in rank, in others breaking a section into series, as was true in regard to Sect. *Fuscae* C.B. Clarke. Here, her decision seems to have merit since her Series *Fuscae* and *Fasciculares* do constitute two natural and distinct sections within the section *Fuscae* as conceived by Clarke, later by Kükenthal. A key to the proposed sections is below:

1. Tubercle edges with at least some setae; fruits narrowed to a stipe-like vari-  
ously setose or setulose receptacle, the lenticular body under 1 mm wide  
and mostly broadest above the middle, the surfaces lustrous, often with a  
pale, glassy central disc ..... Sect. **Fuscae**
1. Tubercle edges smooth; fruits not narrowed to a stipe-like base, the lenticu-  
lar body over 1 mm wide (except for *R. fernaldii*) and broadest at the middle,  
the surfaces smoothish but dull ..... Sect. **Fasciculares**



Since this particular report bears only on *R. crinipes* and its relatives in the proposed Section *Fuscae* I am deferring a consideration of the *Fasciculares* until a later date. The species accounts below are based upon the examination of many hundreds of specimens (and in field work) but for economy only recent collections records will be cited, along with maps to show general distribution.

**Rhynchospora** Vahl, Enum. Pl. 2:229. 1806, subgenus **Rhynchospora** Sect. **Fuscae** (C.B. Clarke) Kral, stat. nov. *Rhynchospora* Series B. *Diplostyleae* Sect. 4, *Fuscae* C.B. Clarke in Urban, Symb. Ant. 2:105. 1900 (in part); *Rhynchospora* V. *Glomeratae* Small, Man. SE Fl. 175. 1933 (in part); *Rhynchospora* Sect. *Eurhynchospora* Ser. 4. *Fuscae* (C.B. Clarke) Gale, Rhodora 46:169. 144.

Solitary to cespitose, sometimes scaly-rhizomatous, perennials. Culms mostly erect to ascending-arching, subtrigonous, leafy, the leaves filiform to linear, blades flat to conduplicate or canaliculate, apically narrowed to triquetrous tips. Inflorescence of (1-)2-4(-7) mostly turbinate to hemispheric compounds of fascicles. Spikelets lanceoloid to narrowly ellipsoid, producing 2-4 or more fruits, the scales loosely spirally imbricate; receptacle often stipe-like, frequently setose; perianth of 6 antrorsely barbellate bristles, these always overtopping fruit body, often setose at or toward base; stamens 2 to 3; fruit body mostly obovoid to ellipsoid, biconvex, under 1 mm wide, broadest above middle, the faces smooth, usually glossy; tubercle triangular to triangular-subulate, flattened, its edges variably setulose-ciliate.

TYPE SPECIES:—*Rhynchospora fusca* (L.) W.T. Aiton.

Six well-marked species, with *R. fusca* in eastern Canada and New England south in the Coastal Plain to Maryland, the other five primarily southward, mostly in the Atlantic and Gulf Coastal Plains with some extending yet southward into the Antilles and/or Mexico and Mesoamerica.

Below is a key to species, this followed by some notes on the individual species as I see them.

#### KEY TO SPECIES OF SECT. *FUSCAE*

1. Spikelets (4.5-)5-7 mm long.
2. Fruit body broadly ellipsoid to obovoid; leaf blades filiform to linear.
3. Plants sparsely or densely cespitose, but also strongly clonal by slender rhizomes; stipe joint stout or lacking; leaf blades filiform.
4. Culms few per clump; longer involucre bracts of terminal fascicle much exceeding it; fruit from stipe base to tubercle tip ca. 2.5 mm, the stipe smooth; fruit body tumidly biconvex; tubercle edge usually setulose only at base; northern ..... 1. *R. fusca*
4. Culms densely disposed; longer involucre bracts of terminal fascicle barely if at all exceeding it; fruit from stipe base to tubercle tip ca. 2 mm, the short stipe and tubercle edges setose and setulose respectively; fruit body more shallowly biconvex; southern ..... 2. *R. pleiantha*



3. Plants cespitose or, in no. 4 stoloniferous, rooting from elongated buried lower nodes when toppled by flood, then strongly clonal; stipe joint short to elongate, it and receptacle, smooth to variously setose or setulose; leaf blades filiform to linear.
5. Principal leaf blades no wider than 2 mm; fruit from stipe base to tubercle tip to 2.7 mm; fruit stipe joint smooth to sparsely setose, to 0.4 mm; fruit body obovoid, ca. 1 mm wide; spikelet clusters few, mostly 1–3; tubercle triangular-subulate; plants strictly cespitose even when toppled ..... 3. *R. harperi*
5. Principal leaf blades 2–5 mm wide; fruit from stipe base to tubercle tip 2.8–3.3 mm; fruit stipe joint slightly to densely setose, 0.5–1 mm; fruit body narrowly obovoid, ca. 0.8 mm wide; spikelet clusters several, usually 4 or more; tubercle triangular, or sides slightly concave; plants cespitose but clonal when toppled by flood, then rooting at buried lower nodes and stoloniferous ..... 4. *R. crinipes*
2. Fruit body narrowly oblong-ellipsoid; leaves filiform ..... 5. *R. curtissii*
1. Spikelets 3–4 mm long ..... 6. *R. filifolia*

1. *Rhynchospora fusca* (L.) W.T. Aiton, Hort. Kew. ed. 2,1:127. 1810.  
*Schoenus fuscus* L., Sp. Pl. ed. 2, 2:1664. 1763.

*Phaeocephalum fuscum* House, Amer. Midl. Naturalist. 6:202. 1920.

Rarely solitary, mostly sparsely cespitose perennial to 4(–5) dm high, clonal by slender (1–2 mm) imbricate-scaly rhizomes. Culms wiry, ascending to excurved, subterete, multicostate, at midculm 0.5–1 mm thick, leafiest at and toward base. Leaves erect or bowed outward, the principal ones mostly 0.5–2 dm long, the sheath with broad, scarious red-mottled border, at apex with a convex “V” shaped low scarious ligule; blades narrowly linear to filiform, at base to 1.5(–2) mm wide, narrowly involute, upblade gradually narrowing to broadly, then narrowly canaliculate, tapering to a sulcate triangular apex, the tip typically blunt, the margins smooth. Fascicles of spikelets mostly compound, appearing to be 1–3(–4), all exceeded by one or more subtending, setaceous-tipped bracts, cylindrical or (mostly) narrowly to broadly turbinate, rarely hemispheric, 1–1.5 x 0.5–1.5 cm, sparse to dense, the terminal complex of up to 3 or even more approximate fascicles, the laterals progressively more distant longer-peduncled, longer-bracted, downculm; spikelets broadly to narrowly ellipsoid-lanceoloid, 5–7 mm, narrowly acute, pale to deep red-brown, scales several, the lowest barren, often cuspidate-aristate; fertile scales, mostly 2–3(–4), narrowly ovate to oblong-lanceolate, 4–5(–6) mm, acute, convex to navicular, the strong midcosta excurrent as mucro or cusp; stipe and receptacle stubby, 0.2–0.3 mm, usually smooth; perianth mostly of 6, antrorsely barbellate bristles to 2.5 mm, the longer extending past base of tubercle, mostly past its tip; stamens 2–3, anthers 2–2.5 mm long; fruit body tumidly lenticular, obovoid, 1–1.3 mm, narrowly and inconspicuously margined, at apex with a shallow trough below the sharply raised tubercle base, faces



pale to deep brown, lustrous, longitudinally finely lined, transversely very finely rugulose with wavy rows of very narrow, vertical cancellae, sometimes also with lines of shallow pits; tubercle strongly subulate, (0.7–)1–1.2(–1.5) mm, the edges scabrid-setulose only toward base. Figure 1.

Wet to moist sandy (often sphagnum) peats of bogs, pondshores, seeps, acidic wetlands, northeastern North America, in Canada from the maritimes westward to Lake Superior region, in the U.S. from New England westward from New York to northern Illinois, Wisconsin and Minnesota, southward in the Coastal Plain to New Jersey and Maryland. Europe.

Relationships of this widespread sedge are plainly closest to *R. pleiantha* and will be taken up there. No specimen citations are given here.

**2. *Rhynchospora pleiantha* (Kük.) Gale, *Rhodora* 46:171. 1944. *R. filifolia* var. *pleiantha* Kük. Feddes Repert. Spec. Nov. Regni Veg. 23:208. 1926. TYPE: CUBA. PINAR DEL RIO: Laguna Sta. Maria, 22 Aug 1923, *Ekman 17242a* (LECTOTYPE: NY; ISOTYPE: US).**

Densely cespitose perennial (1.7–)2–4.5(–5.3) dm high, strongly clonal by slender (to 2 mm thick) scaly rhizomes. Culms wiry, ascending to excurved, obtusely angled or subterete, multicostate, at midculm mostly 0.4–0.7 mm thick, leafiest at and toward base. Leaves erect to bowed outward, principal ones 1–2 dm long, the blades filiform, proximally shallowly to deeply canaliculate, upblade becoming convolute or conduplicate, then triquetrous to a short, blunt, scabrid-edged tip. Fascicles of spikelets 1–2(–3), mostly narrowly to broadly turbinate, rarely hemispheric, each with few to many pale to deep red-brown, lanceoloid spikelets, the terminal fascicle largest, sometimes lobed, equalled or slightly exceeded by a stiff, erect, linear-setaceous bract. Spikelets 5–7 mm long, acute, scales several, the 2–5 fertile ones narrowly ovate to broadly oblong-lanceolate, (3.5–)4–5 mm, acute, convex to navicular, only the midcosta evident, this excurrent as an aristula; stipe and its receptacle short, rarely to 0.3 mm, from setulose to nearly smooth; perianth of 6 antrorsely barbellate bristles ca. 2–3 mm, extending to tubercle tip or beyond; stamens 2(–3), anthers linear, ca. 2 mm; fruit body biconvex, narrowly to broadly obovoid, 0.8–1 mm, margined and apically broadly but shallowly sulcate below raised edge of style base, usually lustrous brown, often with a paler oval “disc” at center, the surface very finely longitudinally lined, sometimes finely reticulate-cancellate; mature tubercle triangular-subulate, 0.7–0.9 mm setulose only toward slightly decurrent base. Figure 2.

Wet fine sands or sandy peats, mostly around karst ponds or in their environs, Atlantic and Gulf Coastal Plain, North Carolina south to peninsular Florida, western Florida and contiguous southern Alabama. Cuba. Figure 3.



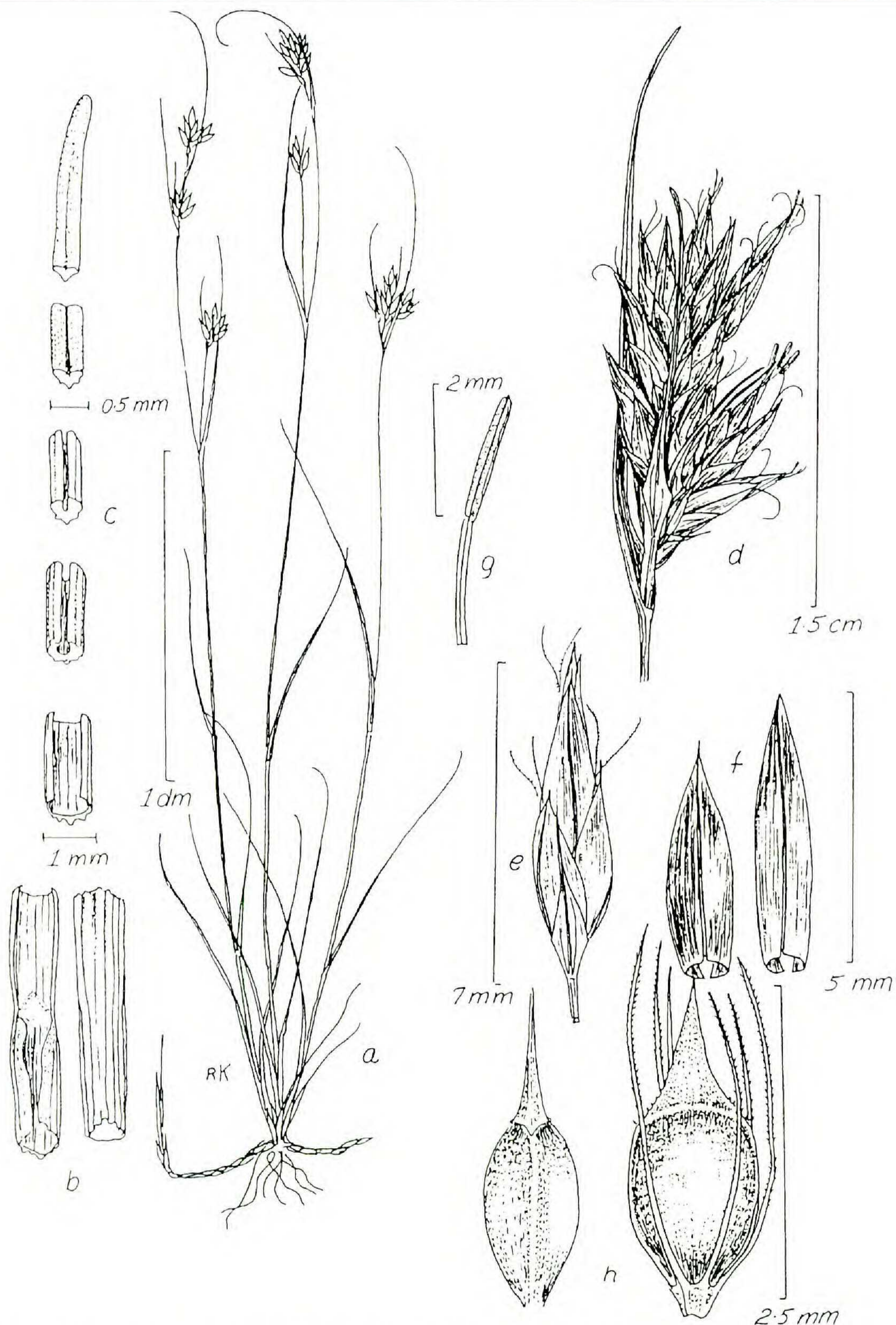


FIG. 1. *Rhynchospora fusca* (Kral 78328). A. Habit sketch. B. Leaf sheath-blade junction, adaxial view (left), abaxial view (right). C. Sectors of leaf blade from distal (bottom) to apical (top). D. Apical compound fascicle. E. Spikelet. F. Fertile scales, lower (left), upper (right). G. Anther and upper filament. H. Mature fruit & perianth, edge view (perianth removed) at left, face view (right).



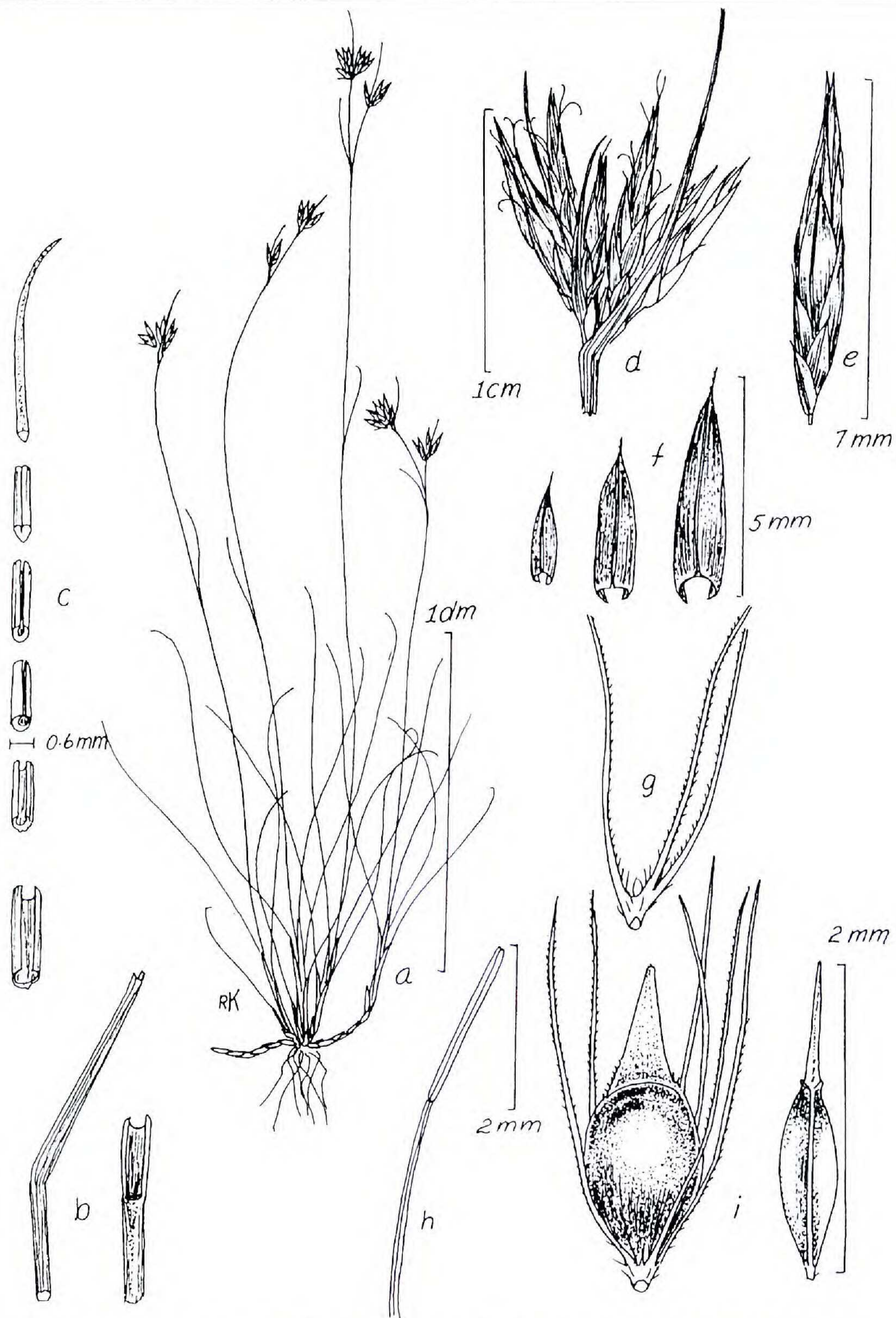


FIG. 2. *Rhynchospora pleiantha* (Kral 81119). A. Habit sketch. B. Leaf sheath-blade junction, abaxial view (left), adaxial view (right). C. Series of sections of leaf blade from near base (bottom) to tip (top). D. Apical fascicle. E. Spikelet. F. Spikelet scales, lowest sterile (left), lower fertile (middle), upper fertile (right). G. Receptacle and stipe with 3 bristles. H. Top of one stamen. I. Mature fruit with stipe and perianth (left), side view of fruit body (right).



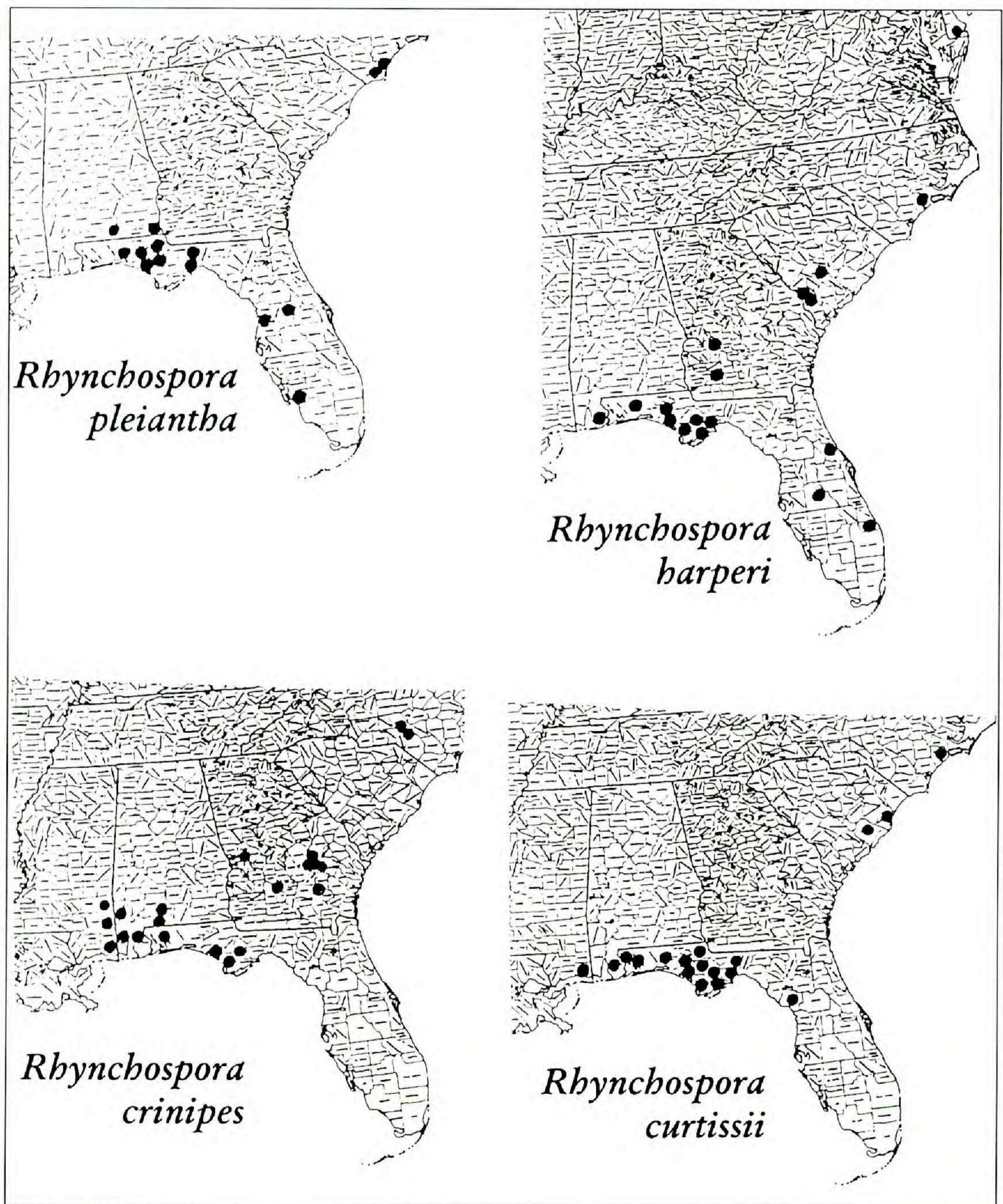


FIG. 3. Distribution of *Rhynchospora pleiantha*, *harperi*, *crinipes*, and *curtissii* in the southeastern United States.

Gale (l.c., p. 172), as mentioned earlier here, appears to have it right in determining that *R. pleiantha* is a close relative of the more northern *R. fusca*. As she mentioned in the synonymy, Dr. R. Harper, a very astute observer and collector of sedges, considered the two conspecific. Both are low, cespitose and with wiry culms and leaves of similar dimensions; both have few fascicles per culm, these generally rather closely spaced at and near culm apex, these similarly narrowly to broadly turbinate and of similar color; the fruits, including receptacle-stipe, are similar in shape, color



and most surface features. Interestingly, Gales description of *R. pleiantha* excludes the slender scaly rhizomes abundantly produced by this species and which are likewise produced by *R. fusca*, a feature which ties the two even more closely together. Other differences mentioned by Gale are however consistent and enough to "make" species, as in the short stipe-receptacle and the perianth bases of *R. fusca* being smooth or nearly so, the more tumid fruits consistently, if slightly, longer and broader. Also, the setaceous bract subtending the terminal fascicle much exceeds it in *R. fusca*, whilst in *R. pleiantha* is ranges from slightly shorter to slightly longer than that fascicle. But a consistent taxonomy would, if the two were sympatric at all, be to make them geographic variants.

In habitat *R. pleiantha* is remarkably uniform over its range. It can form bands along the shores of karst ponds and lakes, these fluctuating borders providing a substrate of fine sand and peat.

While many more specimens from herbaria were studied from loans, I am citing only those here at VDB, several of these representing numerous duplicates of my numbers, now distributed or soon to be (here and subsequently indicated by "t.b.d."):

Specimens examined: U.S.A. ALABAMA. Covington Co.: sandy upper shores of Blue Pond, Blue Springs Wildlife Mgmt. Area, SW Andalusia, 1 Jun 1970, *Kral* 39499 (VDB & widely distributed). Houston Co.: sandy peaty shores of limesink pond by co. 4, ca. 4 mi W Chattahoochee State Park entrance, *Kral* 47261 (VDB & widely distributed); sandy peat at edge of Indigo Pond, SE of Cottonwood, 20 Aug. 1977, *R. Kral* 60845 (VDB & widely distributed); sandy peaty edge of doline by co. 8, W of entrance to Chattahoochee State Park, 20 Aug. 1993, *R. Kral* 83230 (VDB, set to be distributed). FLORIDA. Bay Co.: just to S side of FLA 20, 4.4 mi E its jct. with FLA 77, generally N of Vicksburg, 14 Aug 1990, *R. K. Godfrey* with *A. Gholson* 83950 (FSU, GH, VDB); sandy peat of shores of small doline S side FL 20, N of Bennett, ca 3 mi W of Iconfina River, 18 Jul 1992, *R. Kral* 81199 (BM, BRCH, CM, CTB, FSU, GH, K, KANU, M, MICH, MO, MSC, NCU, NY, PH, SMU, VDB). Calhoun Co.: sandy peaty exposed shores and bottom of cypress-myrtle-leaved holly pond, U. S. Rt. 90, 3 mi E of Bay Co. line, W of Clarksville, 10 Aug. 1976, *R.K. Godfrey* 75328 (FSU, VDB, etc.). Hernando Co.: 3 mi N of Weeki Wachee Springs; abundant on moist to wet sands at margin of hypericum pond, 9 Jun 1958, *R. & M. Kral* 6786 (FLAS, FSU, GH, USE, VDB, etc.). Jackson Co.: sandy peaty shores of Race Pond, sect. 1, T4N, R8W, W of Apalachee Wildlife Mgmt. Area on Lake Seminole, *R. Kral* with *A. Gholson* 60789 (VDB). Leon Co.: sandy soil, upper exposed margins of pond, sinkhole pond amidst sand ridges near Springhill Rd., ca. 1/4 mi S of Capital Circle, S of Tallahassee, 12 Jun 1976, *R.K. Godfrey* 75062 (FSU, VDB); ca. 4 mi S of Tallahassee on sandy peat of upper margin of limestone pond in longleaf pine-turkey oak forest; plants stoloniferous, 15 Aug 1962, *R. Kral* & *R.K. Godfrey* 15581 (FSU, VDB); sandy peaty shores of Dog Lake, SW of Tallahassee in Apalachicola National Forest, 3 Jul 1993, *R. Kral* 82783 (BRCH, MO, VDB). Wakulla Co.: damp sandy shores of a lake between Tallahassee and St. Marks, anno ca 1843, *F. Rugel* 601 (BM, FLAS, VDB). Walton Co.: ca 2 mi E of county line by US 98; sandy border of small pond within sight of Gulf, 12 Jul 1963, *R. Kral* 17750 (VDB); sandy peat at edge of Lake Chipley SW of S arm Juniper Lake and ca 1 mi E of US 331, NW side De Funiak Springs, 23 Jul 1993, *R. Kral* 82930 with *G. Moore* (BRCH, CM,



CTB, GA, GH, IBE, MICH, MO, NCU, NY, OSC, PH, VDB). Washington Co.: sandy shores of Chain Lakes, W of Greenwood, 6 Jul 1963, *R.K. Godfrey & N.C. Henderson* 62955 (FSU, VDB); sandy peat of shores of pond, campsite, Pine Log State Forest ca 0.5 mi W of FL 79, 15 Aug 1992, *R. Kral* 81506A (BRCH, CTB < GH, MO, VDB); sandy peat of shore of 5-acre doline ca 1/2 mi N of FL 20, ca 4.6 mi E of jct. FL 77, 16 Aug 1992, *R. Kral* 81541 (FSU, MO, VDB). NORTH CAROLINA. Brunswick Co.: sandy peat at edge of Blue Pond, ca 4.2 mi SW Jackies Creek and NC 133, ca 500 yds NW from McKenzie Pond, 1 Jun 1980, *R. Kral* 65265 (VDB).

3. ***Rhynchospora harperi*** Small, Fl. SE U.S. 182. 1903. <b9,10>*R. fascicularis* (Michx.) Vahl var. *harperi* (Small) Kük., Bot. Jahrb. Syst. 75:111. 1950. TYPE: U.S.A. GEORGIA. PULASKI CO.: wet pine barrens ca 3 mi E of Hawkinsville, *R.M. Harper* 1337 (HOLOTYPE: NY; ISOTYPE: US).

*R. leptorhyncha* sensu Small, Fl. SE U.S. 195. 1903, non C. Wright, 1871.

Cespitose perennial (3–)5–8(–9) dm high. Culms erect to arching, obtusely angled to subterete, rarely filiform, more often distinctly broader than leaf blades, at ca midculm (0.5–)1–2 mm thick, strongly costate, leafiest at and toward base. Leaves erect to ascending, mostly straight, principal ones 1–2 dm long, blades linear-filiform, 0.5–1.0 mm wide, proximally slightly inrolled (broadly canaliculate), upblade increasingly narrowly conduplicate with midcosta strongly raised abaxially, thence gradually narrowing, adaxially sulcate, to a triangular or subtriquetrous apex, the very tip slightly flattened, blunt, scabrid-margined. Fascicles (1–)2–3, turbinate to hemispheric, 0.7–1.5 × 1–2 cm, each with few-to-many lanceoloid pale to deep red-brown spikelets, the terminal fascicle largest, densest, often lobed or with another immediately subtending, usually atop a distinctly bent or excurved internode, equalled or exceeded by one or more subtending linear-setaceous bracts; spikelets 5–7 mm, narrowly acute; scales several, the 2–4 fertile ones narrowly ovate to broadly oblong-lanceolate, (2.5–)4–5 mm, acute, convex to navicular, only the midcosta evident, this distally scabrid, excurrent as a cusp or aristula; stipe and its receptacle short, 0.2–0.3 mm, usually sparsely setose and setulose; perianth of 6 antrorsely barbellate bristles 1.5–2.5 mm, extending from mid-tubercle to beyond tubercle tip; stamens 2(–3), anthers linear, ca. 2 mm; fruit body biconvex, broadly obovoid, 1–1.4 mm, margined and apically broadly grooved below the narrow, sharply raised tubercle collar, faces glossy, pale to dark brown, often with a paler oval disc at center, finely longitudinally lined, variably low papillate-cancellate, also often transversely with wavy lines of dark punctae; mature tubercle triangular-subulate, (0.8–)0.9–1(–1.1) mm, edges densely pale setulose-scabrid. Figure 4.

Moist to wet sands and peats of pond shallows and shores, Atlantic and Gulf Coastal Plain, from Maryland and Delaware, then North Carolina south to southern Florida, westward to panhandle Florida and southern Alabama. Figure 3.



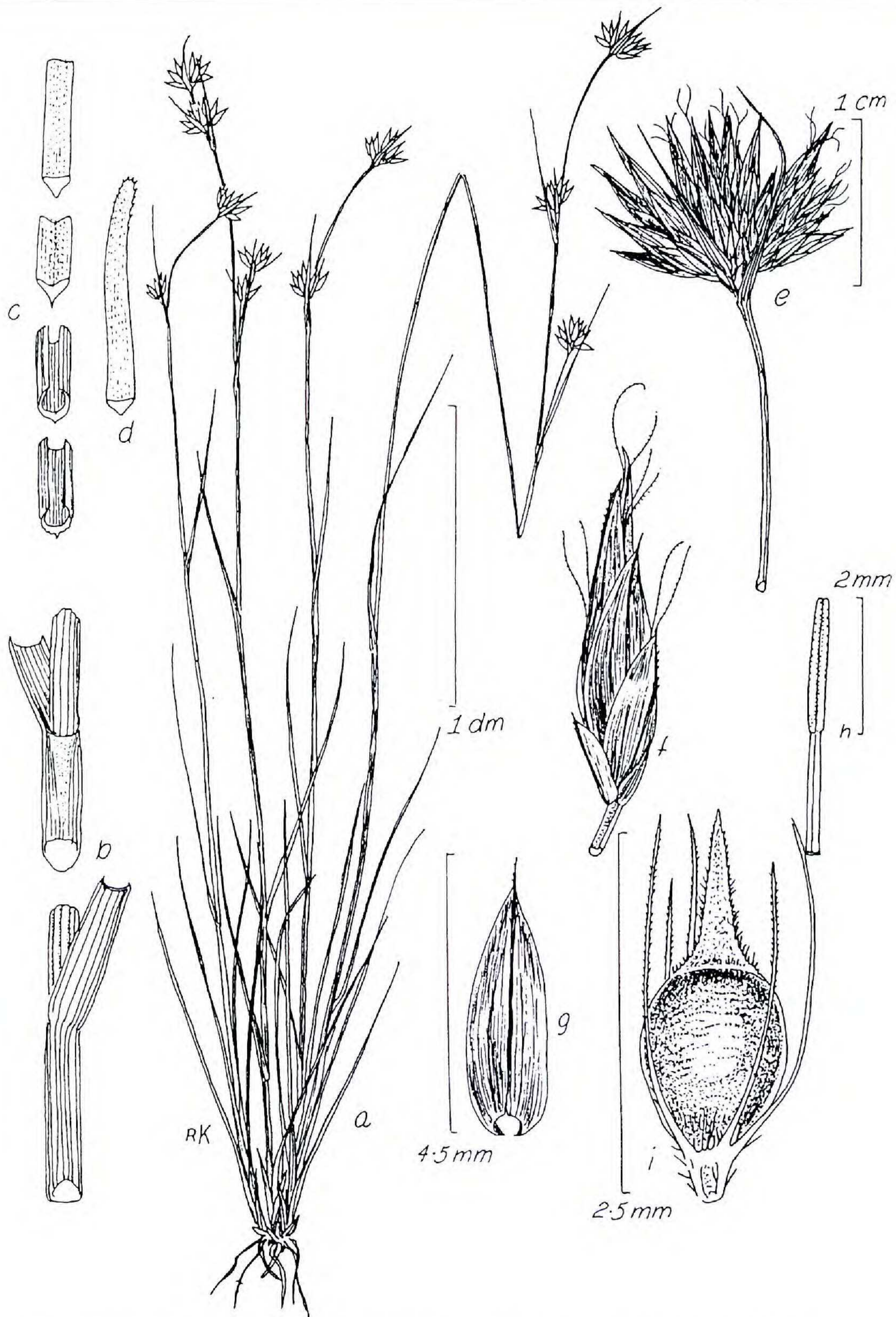


FIG. 4. *Rhynchospora harperi* (Kral 85337). A. Habit sketch. B. Leaf sheath-blade junction, abaxial side (below), adaxial side (above). C. Series of sectors of leaf blade from distal (below) to distal (top). D. Leaf apex. E. Terminal fascicle. F. Spikelet. G. Fertile bract. I. Face view of mature fruit.



Richard LeBlond has reported records for this species, until then thought confined to Florida, Georgia and Alabama so that we now know it from several additional states. My own experience with it thus far is within its area of greatest abundance, namely panhandle Florida, where optimum habitat is pond shallows in *Taxodium ascendens*-*Nyssa (biflora, ursina)*-*Ilex myrtifolia*-*Cyrilla* in the pine-saw palmetto flats, where it is mostly admixed with various species of shrubby myriandrous *Hypericum*, or along ditches or shallow moats bordering pine savanna bogs. It should be noted that the Delaware and Maryland *R. harperi* is a far cry from that of North Carolina southward, being lower, narrower-leaved, with smaller fascicles, the terminal internode mostly lacking the "bend," the fruits on the short side of the range. However, this material, while strongly resembling *R. filifolia*, would be difficult to place there or elsewhere except in *R. harperi*.

Specimens examined: As is the case with *R. pleiantha* (above), I am citing only those specimens here at VDB: U.S.A. **DELAWARE**. Sussex Co.: Assawoman Pond, 17 Sep 1991, *R.J. LeBlond* 2552 (VDB). **FLORIDA**. Bay/Washington Co.: sandy peat of sloughs in pine-cypress savanna, FL 20 by cty marker, E of Ebro, 9 May 1995, *Kral* 84643 (FSU, GH, MO, VDB). Franklin Co.: deep-banked drainage ditch lined with *Hypericum fasciculatum* 2 mi. E of rte 65 S side Buck Siding Rd, SE1/4 of NW1/4 Sec.9, T7S,R7W, 14 Jul 1988, *L.C. Anderson* 11611 (FSU, VDB); standing water of cypress stringer, S side forest rd 148, between open savannas, 0.4 mi W of rte 65, 6.5 mi S of Sumatra, 23 May 1989, *L.C. Anderson* 12004 (FSU, VDB); wet peaty sand, pond cypress in Tate's Hell Swamp, 1.5 mi E of High Bluff Creek, ca 7.5 mi NE Eastpoint, 28 May 1991, *L.C. Anderson* 13429 (FSU, VDB); abundant over large area of dwarf pond-cypress forest, Tate's Hell Swamp, E of FL 65, *R. K. Godfrey* 83880 with *W. Baker* (FSU, GH, VDB); sandy peats of cutover cypress-gum-pine flats by FL 65, 2.2 mi N of jct. US 98, 3 Jul 1993, *R. Kral* 82800 (BM, BRCH, CLEMS, CM, CTB, FSU, GA, GH, K, KANU, MBM, MICH, MO, MSC, NCU, NY, TENN, TEX, US, USCH, VDB, VSC, WAT, WILLI, WIS); sandy peat of edge of small cypress dome in scrub, end of shell road, East Point, ENE end of FL 65, 20 Jul 1993, *R. Kral* 82846 with *G. Moore* (FSU, GH, K, KANU, MICH, MO, NCU, NY, TEX, USCH, VDB, WIS). Gulf Co.: bog bordered by *Hypericum chapmanii* in clearing of thick *Cyrilla* scrub betw. Daniels Rd. and Wetappo Creek, 4.3 mi S of rte 22, ca 5.5 mi SW Wewahitchka, 20 Jul 1989, *L.C. Anderson* 12170 (FSU, VDB); sandy peaty swale in *Hypericum-Cyrilla-Nyssa*-pine, flats by Fl 71, 6-7 mi S of Wewahitchka, *R. Kral* 82854 (GH, MICH, MO, NY, USCH, VDB); sandy peat of ditch through slash pine flats, S side US 98, 5 mi W of Franklin Co. line, 21 Jul 1993, *R. Kral* 82868 (BRCH, CM, GA, GH, K, MICH, MO, NCU, NY, TENN, TEX, US, VDB); and same locale but with dwarf cypress, *R. Kral* 82869 (VDB). Liberty Co.: common in shallow water of depression along railroad bordering slashpine flats E of rte 65 a few mi NE Wilma, 10 Jul 1992, *L.C. Anderson* 13706 (FSU, VDB); by Fl. 65 plus or minus 5 mi N of Sumatra, borrow pit, aspect dominant *Hypericum chapmanii* P. Adams, 26 Jul 1993, *R.K. Godfrey* 84647 (FSU, GH, VDB + 43 duplicates elsewhere); sandy peat of shallow *Hypericum* pond by W side FL 65, 22 mi S of Telogia, abundant, 3 Jul 1993, *R. Kral* 82809 (CLEMS, GH, KANU, MO, NCU, NY, TEX, USCH, VDB, VSC, WIS). Martin Co.: slash pine flats at S side Stuart off US 1, pond shallows, 18 Sep 1973, *R. Kral* 51780 (VDB & distributed); sandy peat of shallow *Hypericum-Taxodium* pond by Willoughby Ave., ca. 1/4 mi N of jct. co. 722, scarce, 8 Jul 1994, *R. Kral* 83706 (BRCH, FSU, MO, NCU, VDB, NY). Okaloosa Co.: small gum



pond in longleaf pine savanna near gravel rd intersect 1 mi N of Beaver Creek, ca. 3.5 mi N of Fl 4 ca 7 mi E of Munson; Danley Ponds, Blackwater State Forest, 10 Jul 1990, *S.L. Orzell & E. L. Bridges 14275* (TEX, VDB). Volusia Co.: upper transitional zone from open graminoid flatwoods pond to clearcut slash pine flatwoods, ca 4.7 mi W jct. Fl 40 and US 17 in Barberville, 12 Jun 1990, *S.L. Orzell & E.L. Bridges 13921* (TEX, VDB). Walton Co.: sandy peat of pond cypress-pine savanna, FL 20, 1.1 mi E of Bruce, frequent, 18 Jul 1995, *R. Kral 85337* (BM, BRCH, CM, FSU, GA, GH, K, KANU, MBM, MICH, MO, MSC, NCU, NY, US, VDB). Washington Co.: sandy peaty *Nyssa-Taxodium ascendens-Hypericum* flats ca. 1/2-1 mi W of Bay Co. line marker by FL 20 just E of Ebro, 19 Jul 1993, *R. Kral 82820* (CLEMS, CTB, GH, MICH, MO, MSC, NCU, NY, TEX, US, USCH, VDB, VSC, WAT); Fla 20, 1/8-1/4 mi W of Bay Co. line in cypress-pine savanna, sandy peat, *R. Kral 85322* (NY, US, VDB); & t.b.d.). NORTH CAROLINA. Onslow Co.: Camp Lejeune Marine Corps Base, wet peat of graminoid-forb dominated meadow, 2 Aug 1990, *R.J. LeBlond 1549* (VDB); Camp Lejeune Marine Corps Base, in a 3-acre shallow pond S of the jct. of Sneads Ferry and Marines Rds., 6 Aug. 1990, *R.J. LeBlond 1552*. (VDB).

**4. *Rhynchospora crinipes* Gale, Rhodora 46:173. 1944. *R. filifolia* A. Gray var. *crinipes* (Gale) Kük., Bot. Jahrb. 75(1):106. 1950. TYPE: U.S.A. ALABAMA. MOBILE CO.: ditches, borders of ponds, Mobile, 18 Jun 1868, *Charles Mohr s.n.* (HOLOTYPE: US!); dry places, roadsides (exsiccated), Mobile, Jun 1868, *Charles Mohr s.n.* (PARATYPE: US!).**

Solitary or cespitose perennial 6–10(–15) cm long, often strongly clonal through toppling by flood, lower internodes thus elongating, rooting at nodes stoloniferously. Culms lax, erect to ascending, excurved distally, at midculm mostly 2–3 mm thick, obscurely trigonous to terete, multicostate, leafy. Leaves lax, the lower ones often trailing after flood, principal ones toward and at culm base, 20–50 cm long; blades narrowly linear, 2–4(–5) mm wide, proximally flattened, at base slightly concave, midcosta slightly raised abaxially, thence upblade more level with midcosta strongly raised abaxially, thence to “v” shaped, with midcosta a sulcus adaxially, very raised abaxially, thence tapering and triquetrous to a subulate tip. Fascicles of spikelets mostly compound, (3–)4–7(–10), mostly narrowly to broadly turbinate, less often hemispheric, ellipsoid or ovoid, 1.2–2 × 1–2.5 cm, all short-pedunculate, the lower ones distant, and much exceeded by subtending foliaceous bract, upculm progressively more approximate and shorter-bracted, the apical ones exceeding or but slightly overtopped by linear-subulate bract(s); spikelets lanceoloid, 5–5.5 mm, acute to acuminate, light red-brown (on flooding darkening to very dark brown, appearing nearly black); fertile scales narrowly ovate to lanceolate, 4–4.5 mm, convex with the evident midnerve excurrent as aristula or mucro; stipe and receptacle 0.5–0.8(–1.0) mm sparsely to densely setose; perianth of 6 ascending, setose-based, antrorsely scabrid bristles 2–2.5 mm reaching above tubercle base, more often to or beyond its tip; stamens typically 2, anthers linear, ca 2 mm; fruits 2–4 per spikelet, the body lenticular, pale-margined, nar-



rowly to broadly obovoid, 1.2–1.5 mm, faces apically concave below sharply raised tubercle base, brown to even castaneous, lustrous, often with a pale glassy midzone, the surface minutely striolate, sometimes transversely minutely rugulose and with wavy rows of dark punctulae; tubercle triangular, sometimes slightly subulate (concave-edged), 0.7–1.1 mm, setulose-ciliate from base to tip, the slightly lunate base flowing to the strong fruit margin. Figure 5.

Banks, bars, shoals of blackwater streams, less often ditchbanks and sluggish drainage from flatwoods bogs and ponds, Atlantic and Gulf Coastal Plain, North Carolina; Georgia south to northwestern Florida, southern Alabama, southeastern Mississippi. Figure 3.

*Rhynchospora crinipes* is unquestionably the most distinct species of its subcomplex in Sect. *Fuscae*. In habit it is tallest, has the thickest culms, the broadest leaf blades. While the plants are typically cespitose, in common with the other species, they are unique in their reaction to toppling, in that culm bases when buried by wash produce elongated lower internodes and increase stoloniferously, thus rooting at one or several lower nodes. The plant bases therefore are often more deep-set, stubbornly hanging on through flood cycles, forming extensive clones in the “best” habitat when other species of *Rhynchospora* may wash away. In fact, dislodged plants may for the same reason reroot more readily in similar habitat downstream. So, while rootstocks of the species have been described as rhizomatous, they are truly stoloniferous, very unlike the true rhizomes produced in *R. fusca*, *R. pleiantha* of the subcomplex which are narrower with spirally imbricate scales. It differs from the others in numbers of fascicle compounds, rarely as few as 3 per culm, (generally the maximum number for the others) more often 5 or more per culm. There is overlap in fascicle and bract shape and dimension, as well as in shape and size of spikelet and number of fruit per spikelet, but none in length and indument of stipe and receptacle, this being the longest and shaggiest of the complex. Actually, in the field, a common companion *Rhynchospora* from another complex, namely *R. glomerata* (L.) Vahl bears the strongest resemblance in general dimensions of culm, leaf, and inflorescence (but not clonal by stolon), differing mainly in character of flower and fruit. Within the complex only *R. filifolia* may be abundant in such habitat but is easily distinguished on a basis of habit, being lower, with narrower leaves and culms, but non-clonal by stolon, with fewer and smaller spikelet clusters, smaller spikelets.

Differences between *R. crinipes* and *R. filifolia* are even stronger when one consults the flower and fruit, the former with a longer, hairier stipe-receptacle, a similar shaped fruit body, but longer and not as smooth, a tubercle that is longer, often less triangular (straight-sided).

Thanks to support from Botanists Cary Norquist (U.S. Dept. of Interior,



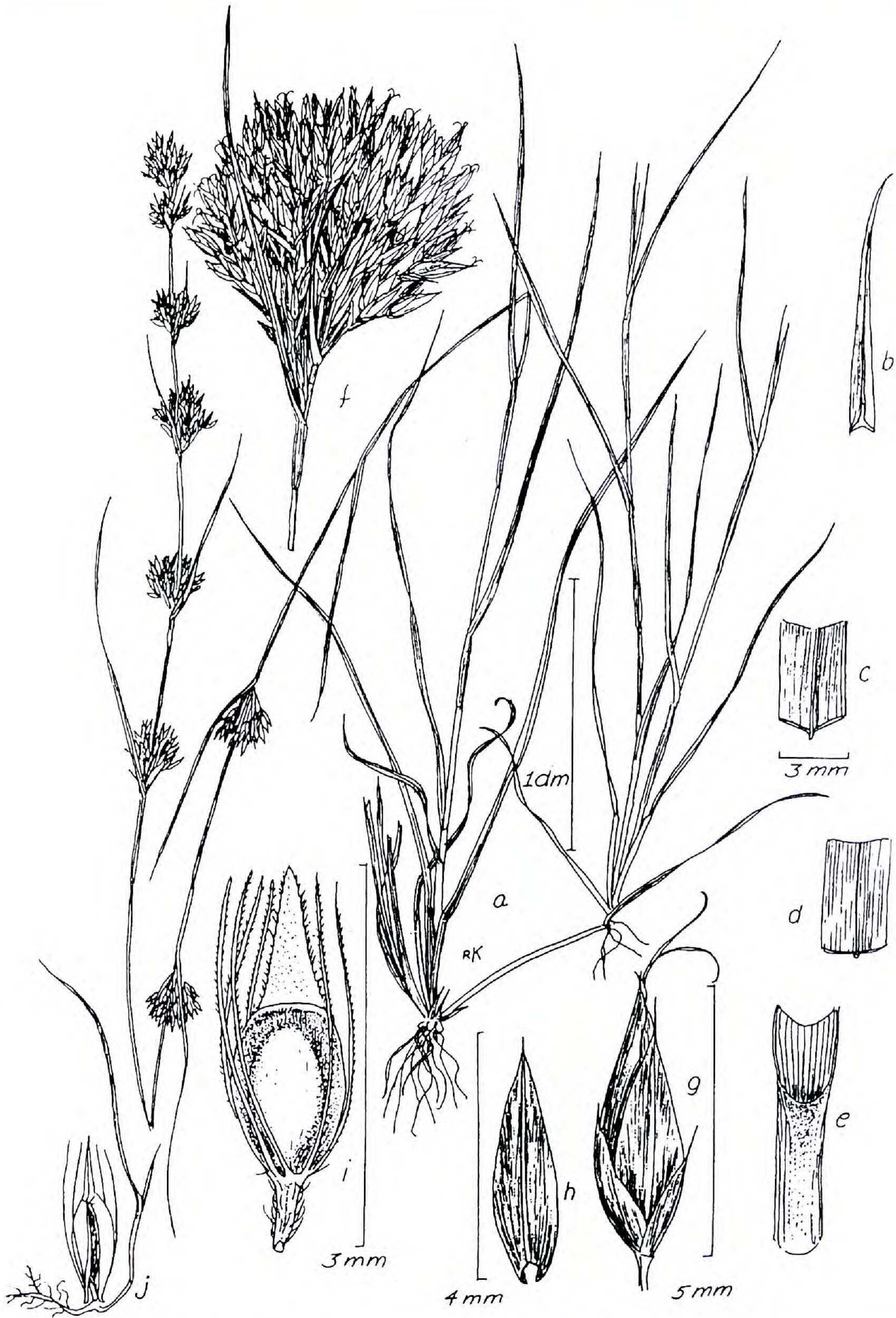


FIG. 5. *Rhynchospora crinipes* (Kral 85409). A. Habit sketch. B. Leaf apex. C. Sector of leaf midblade, adaxial view. D. Sector of leaf midblade, abaxial view. E. Leaf sheath-blade junction, adaxial view. F. Terminal fascicle. G. Spikelet. H. Face view of mature fruit. J. Fruit with sprouting seed.



Fish & Game, Jackson Office) and Jeryl L. Hilton (Alabama Natural Heritage Program, the Nature Conservancy office, Montgomery) I have been able to do a proper field survey of this *Rhynchospora* over what is presently known to be its geographic range. My notes below on habitat are based on personal encounters from 33 sites, as well as from consultation of vouchers through loans or sendings of duplicates from knowledgeable colleagues such as Bruce Sorrie (North Carolina) and Loran Anderson (Florida). The survey has resulted in re-establishment of it in Alabama, establishment of Georgia records, and extension of its known range to Mississippi. While efforts to locate it in South Carolina and eastern Louisiana have thus far not been successful, such should be continued since there is plenty of suitable habitat there. Thus, "suitable" habitat is discussed below.

The geographic distribution of *R. crinipes* as presently understood is rather remarkable. A general realization of it can come from a map of the southern Atlantic and Gulf Coastal Plains, on which *Chamaecyparis thyooides* (L.) B.S.P. (including *C. henryae*) is shown (Little, E.L., Atlas of United States Trees, Vol. I, Map 11-E. 1971) since most of the optimal sites are in, or are upstream or downstream from *Chamaecyparis* habitat. In my experience, *R. crinipes* is never far from clean, clear, active streams or in seeps directly by them. Such streams, generally a pale wine in color through tinting by acidic-humic seepage are mostly swift and well aerated. They run clear soon and recede quickly after rain when the watershed is healthy. They have distinctive and stable woody and herbaceous bank floras. They have clean, sandy or gravelly sandy bottoms and bars, these often underlain by lenses of gray clay with iron mottling which often are exposed in the swifter runs. They meander, thus cut deeply into steep slopes and deposit large bars of sands and gravels opposite cuts, these bars often of white sands freckled with rounded stones and pebbles of quartz, hardened clay, chert. On the steep sides large trees are often undercut by floodwater, and topple into the stream, often to create considerable "jams" and "dams" with their attendant accumulations of floodwash. In more level stretches, particularly as the valley broadens, sandy-gravelly-silty floodplain develop, these optimum sites for some "high" forest of *Chamaecyparis*, *Magnolia virginian*, *Liquidambar*, *Fraxinus*, *Acer rubrum* (sometimes *Acer saccharum*), various "willow" oak, *Liriodendron*, etc. with *Cyrilla*, *Cliftonia* (southern part of range), various *Myrica*, *Ilex*, *Vaccinium*, thickets of *Arundinaria*, etc. in the understory. As one moves downstream and gradient is less, as floodplains broaden and channels deepen, the amount of good habitat for the rhynchospora becomes less. Within the range of a stream of this sort, the best clones of *R. crinipes* are in full sun or light shade along the narrow banks below cuts, on tails of bars, in seepage areas in cuts and broader banks, or on low, frequently temporarily washed islands. Most of my finds have been around bridgesites,



these of course cleared back to limit of road right-of-way to what is usually a dense vegetation under which the *rhynchospora* becomes quickly more scarce. Wading up and downstream from a bridge gives one a perspective on how the species maintains under natural conditions. In broader streams this sun plant has no problem, but along narrower stretches where a channel is N-S-oriented there is too much shade. In such situations the *rhynchospora* is usually found only where overstory trees have toppled to create openings. In these, over time, clumps of culms are toppled by flood, their bases buried by floodwash, their lower internodes lengthening, their lower nodes rooting and extensive clones thus form. Heavy flood washing may dislodge parts of clones, some re-lodging downstream. The phenology is broad since this species flowers and fruits as early as May and will continue to do so until frost; therefore over a long season an abundant supply of fruits is swept downstream. Most fragments and fruits are doubtless lost, others may survive for short periods in shaded stretches, but in such active streams many openings are formed or reformed and are ideal. I encountered a perhaps anomalous but yet very interesting situation when sampling a large clone on Escambia Creek, Escambia County, Alabama, northeast of Atmore (Kral 85234), where many of the toppled culms had many spikelets in which the fruits had germinated, some actually beginning to take root where fascicles were flat against a patina of slick sandy peat. This again shows a possibility for a remarkable adaptation.

Several other *Rhynchospora* do occur in and immediately around populations of *R. crinipes*, some already noted, such as *R. filifolia*, *R. glomerata*, but also *R. cephalantha*, *R. chalarocephala*, *R. corniculata*, *R. gracilentia*, *R. macrostachya* (in the northern range), *R. microcephala*, *R. nitens*, *R. variflora*. It may, in shaded bottoms, sometimes also be associated with such species of shaded bottoms as *R. caduca*, *R. decurrens*, *R. miliacea*, or *R. mixta* of distinctively different section. But none of these associates have the combination of features that allow as much adaptation to “temperamental” and dynamic blackwater stream habitat that this tenacious and deeper-rooted species has.

There are some other sedges and monocots that can deal well with such sites, most notably *Eleocharis olivacea*, *Scirpus etuberculatus*, *S. subterminalis*, *Orontium*, *Sparganium*, various *Juncus*, particularly *J. polycephalus*, the sedges and *Sparganium* often streaming in massive clones along bars and islands and in shoals. But none of these is better adapted.

I suggest that *R. crinipes* once had a wider distribution along some of the larger streams, since a wider channel would also admit more light, particularly if this was a braided system with many shoals and bars. But, since larger stream systems also have (or had) broader displays of quality trees along them, and since logging of such systems has been generally disas-



trous, consequent extremes of flooding and receding, accompanied by increased siltation and accelerated erosion have washed out or buried these sorts of plants. In short, the continuance of *R. crinipes* very much depends on careful management of adjacent forest and watershed.

An overview of watersheds themselves would show the best ones to be in longleaf pine-deciduous scrub oak, "yellow" sandhills or where, toward the coast (as in Florida, Alabama) streams issue from or flow through Sand pine-evergreen scrub. These systems are fed by seepage or springs, sometimes karst type. The pine-oak-hickory uplands grade downslope to progressively more mesic systems of pines, oaks, hickories and other hardwoods such as *Liriodendron*, *Liquidambar*, maple, downward to a *Fagus-Magnolia (grandifolia)-Acer saccharum* (southern subspecies) type, to the actual streambottoms where are higher silt fractions and *Chamaecyparis-Taxodium*-Virginia bay-Red maple-willow oaks-*Persea-Ilex-Liquidambar* etc. hold forth. It is significant that there are often cutoff meanders, but while these may have abundant sedges along them, *R. crinipes* does not persist long in such places; it has to be part of an actively combed and well aerated stream. The only areas where there seems to be some transition of type is in the Florida Panhandle where some small and comparatively slack streams are flowing into or out of cypress ponds or bogs in a pine flatwoods system (localities in Bay, Gulf, Liberty counties). In these places, particularly along "ditched" flow, *R. crinipes* can be very close to habitat of *R. harperi*, *R. curtissii*.

Vouchers from the 33 sites I have inspected as of 1995, together some sent by Dr. L. Anderson, Dr. M. LeLong, and Mr. B. Sorrie are cited below. Since most of the sites I have sampled had few plants, most of my collections are represented by but one or two specimens and few large sets were therefore made:

Specimens examined: U.S.A. ALABAMA. Baldwin Co.: N side Bay Minette Creek directly across from Buzbee Landing, at waters edge, 23 Jul 1993, *Howard Horne, s.n.* (USAM, VDB); peat-muck slicks and in shallows of branch of Perdido River by county 61 bridge, ca 10 mi E of Bay Minette, 26 Jul 1990, *R. Kral 78170*, first record re-establishing species for Alabama! (BM, BRCH, CM, CTB, FSU, GH, K, MICH, MO, MSC, NCU, NY, TEX, USCH, VDB); same site, 21 Aug 1993, *R. Kral 83269* (VDB, VSC); gravel bars, along Major's Creek off cty 96, W of Rabun, 18 Aug. 1994, *R. Kral 84088A* (MO, MSC, VDB). Conecuh Co.: gravelly-sandy-silty bank of swift creek by gravel road 5.4 mi W of Range, 18 Sep 1993, *R. Kral 83325* (MO, NCU, VDB, WIS); recollected from seep bank, same site, 6 Jun, 1995, *Kral 84890* (NY, US, VDB, VPI). Escambia Co.: sandy-gravelly seeps and banks along Escambia Creek near I-65 crossing SW of Barnett Crossroads, 21 Aug 1993, *R. Kral 83267* (GA, MO, NCU, NY, US, VDB); Co. 27 crossing of Escambia Creek ca 10 mi NE of Atmore; sandy gravelly seep banks along stream, 18 Sep 1993, *R. Kral 83329* (VDB, WIS); and downstream 13 Jul 1995 (fruit germinating in spikelets on toppled culms!), *Kral 85234* (CLEMS, CTB, GH, K, MICH, MO, MSC, NY, TENN, TEX, US, USCH, VDB, VPI, VSC, WAT, WILLI); sandy gravelly bar in Juniper Creek by Al 49, ca 4.9 mi N of Brewton, scarce (the "Juniper" is *Chamaecyparis*), 18 Aug 1994, *R.*



*Kral 84070* (VDB); and abundant along tributary just N, 6 Jun 1995, *Kral 84888* (BM, BRCH, FSU, GA, GH, KANU, MICH, MO, NCU, NY, TEX, VDB). **Mobile Co.:** bars and banks (bluff bases), also forming "islands" above sandy-gravelly shallows, Puppy Creek, N end of AL 217, ca 1 mi S its jct. with Prime Rd., WSW Citronelle above and below bridge. *Chamaecyparis* present, many toppled, 20 Sep. 1993, *R. Kral 83374* (BRCH, CM, FSU, GH, MO, VDB); revisited 10 Jun 1995, *Kral 84994* (ALU, K, MBM, MICH, NY, USCH, VDB). **Washington Co.:** shallows and sandy silty banks of Bassett Creek, cypress-gum-maple, just N of Chatom by US 43, *R. Kral 78266* (BRCH, CM, CTB, FSU, GA, GH, MICH, MO, NCU, NY, TEX, US, VDB, VSC, WAT), revisited 10 Jun 1995, *Kral 84998* (GH, KANU, MICH, MO, MSC, NCU, NY, TEX, US, USCH, VDB, WIS); seeps and shallows of coldwater stream 0.5 mi N of Cty 6 on US 43, 2.7 mi N of Sunflower, 10 Aug 1992, *R. Kral 81313* (CLEMS, GA, GH, MBM, MICH, MO, NCU, NY, TENN, USCH, VDB, WIS); shoals and sandy silty banks of Taylor's Creek, above and below US 43 bridge, 3.4 mi S of Milry, forming large colonies, 10 Jun 1995, *R. Kral 85000* (APSU, BM, BRCH, CLEMS, CM, CTB, FSU, GA, GH, K, KANU, MBM, MICH, MO, NCU, NY, TENN, TEX, UNA, US, USCH, VDB, VPI, VSC, WAT, WILLI, WIS). **FLORIDA.** **Bay Co.:** small boggy stream in slash pine-titi flats by FL 22, 7.8 mi W of Sandy Creek bridge, 20 Jul 1993, *R. Kral 82861* (ASPU, BM, CM, CTB, FSU, GA, GH, K, KANU, MBM, MICH, NCU, NY, UNA, US, USCH, VDB). **Gulf Co.:** sandy silty banks and shallows of Wettapo Creek at FL 22 crossing ca 5 mi W of Wewahitchka, 20 Jul 1993, *R. Kral 82857* (AKG, BRCH, GA, GH, KANU, MICH, MSC, NCU, VDB). **Liberty Co.:** sandy silty gravelly banks and shallows of Moccasin Creek, *Cyrilla-Nyssa-Taxodium*, Apalachicola Nat. Forest, SR 379, ultimately draining into Kennedy Creek. Abundant, 24 Aug 1995, *R. Kral* with *A. Gholson 85600* (AKG, FSU, GH, MO, MSC, USCH, VDB); small stream near Larkin's Farm Rd. by Co. 379, just S of Alligator Creek, 24 Aug 1995, *R. Kral* with *A. Gholson 85602* (AKG, FSU, GH, MO, MSC, USCH, VDB). **Santa Rosa Co.:** moist sandy loam of low left bank of Big Coldwater Creek (via canoe) ca 8 air mi NNE of Milton. New to Florida! 26 Jul 1986, *L.C. Anderson 9827* (FSU, VDB); turf banks along East Fork of Big Coldwater Creek, 6.4 km above Tomahawk Landing, 22 Jul 1990, *J.A. Churchill 90164* (VDB, sent from set by Dr. Churchill); sandy-peaty banks of spring fed stream, along Big Juniper Creek at FL 191 bridge 2 mi SW of Munson, ca. 18 mi NE Milton, Blackwater River SF, 20 Sep 1989, *S.L. Orzell & E.L. Bridges 12443* (TEX, VDB, etc.); FL 191, SW of Munson 2.8 mi; seeps along Juniper Creek just above bridge, 19 Sep 1993, *R. Kral 83353* (GH, NY, US, VDB); ca. 4.5 mi W of Munson at FL 4 crossing Coldwater Creek; sandy-gravelly seep banks along stream, 19 Sep 1993, *R. Kral 83339* (GH, VDB). **GEORGIA.** **Marion/Talbot Cos.:** sandy silty gravelly banks and low cuts of Upatoi Creek, both sides (these from N side), GA 41 bridge, ca 4 mi S of Geneva and E of Juniper, suffering from cutting by DOT mowers, 13 Aug 1995, *R. Kral 85554* (GA, GH, MICH, NY, US, VDB). **Montgomery Co.:** sprigs atop *Nyssa biflora* stumps in small stream just below beaverdam, bayhead by US 221, 7 mi N of Uvalda, full sun, scarce, stream slack and turbid, 12 Aug 1995, *R. Kral 85506* (MICH, MO, VDB). **Toombs Co.:** sandy silty gravelly banks of Pendleton Creek, scarce, by GA 152 bridge, NE of Lyons, 9 Aug 1995, *R. Kral 85428* (VDB); sandy silty gravelly banks of Pendleton Creek, scarce, at Wixtrum's Bridge, by GA 297, N of Vidalia below Interstate, 9 Aug 1995, *R. Kral 85420* (TEX, USCH, VDB). **Treutlen Co.:** sandy silty gravelly banks and shallows, Red Bluff Creek by GA 29, NW of Soperton, scarce, first formal record for Georgia, 14 Jul 1994, *R. Kral 83808* (CTB, FSU, GA, GH, NCU, VDB); sandy seep bank of Pendleton Creek, 0.5 mi S of I-16 by US 221; made scarce by DOT cutting, 12 Aug 1995, *R. Kral 85505* (MO, VDB). **Wheeler Co.:** wet sands, silts and gravels of swift creek (Ochwatkee trib.) above and below GA 46 bridge in full sun and light shade, 9 Aug 1995, *R. Kral 85409* (GA, GH,



NY, VDB, VSC). **MISSISSIPPI.** **Greene Co.:** peat-muck and sand of clear, flowing small stream through bay bottom in pine flats by MS 56, 17.7 mi S of State Line, 27 Aug 1991, first record for Mississippi, *R. Kral* 79807 (CTB, MICH, VDB); gravelly shallows of pine barren stream by MS 57, 11.3 mi S of State Line, 11 Aug 1992, *R. Kral* 81349 (CTB, MO, VDB); gravelly sandy silt of pine barren coldwater stream by MS 57, 15.7 mi S of State Line and 6.1 mi N jct. MS 63, 11 Aug 1992, *R. Kral* 81360 (CTB, GH, VDB); sandy gravelly seeps and shallows of coldwater pine barren stream by MS 57, 5.1 mi N of jct. MS 63 (Leaksville), 1 Aug 1992, *R. Kral* 81369 (VDB). **Jackson Co.:** bars and shallows, gravelly-silty-sand over clay, narrow of Bluff Creek, E side of MS 52 at S side of Van Cleave; large colonies, culms mostly toppled by flood, inundated spikelets looking black; *Chamaecyparis* present, 7 Jun 1995, *R. Kral* 84936 (BM, BRCH, CM, CTB, FSU, GA, GH, K, KANU, MBM, MICH, MO, MSC, NCU, NY, TENN, TEX, US, USCH, VDB, VPI, VSC, WILLI, WIS); sandy silty banks and shallows of small stream by MS 52, ca 5 mi S of George Co. line, occasional, some in full sun, some shaded by *Cyrilla*, 7 Jun 1995, *R. Kral* 84937 (CLEMS, GH, MO, VDB). **Wayne Co.:** Clara, SE of jct. MS 63 & Big Creek, T7N, R7W, S9, open area, on sandy soil in creek, swift flowing water, 1 Sep 1993, *C.T. Bryson* 12920 (CTB, VDB); gravelly shallows of clear, swift stream by MS 63, at Clara, near roadside park, 20 Sep 1993, *R. Kral* 83382 (CM, CTB, GA, GH, MICH, MS, MO, NCU, NY, TEX, US, USCH, VDB, VPI, VSC, WILLI, WIS). **NORTH CAROLINA.** **Hoke Co.:** Fort Bragg Military Reservation: semi-shady bank of Little River, stable Cretaceous clay soil, plants swept prostrate by flooding. First NC record! 27 Aug 1992, *B.A. Sorrie s.n.* (dupl. sent to VDB by Mr. Sorrie). **Moore Co.:** shallows and banks of swift flowing Buffalo Creek (trib. of Little River) by SR 1001 (Lobelia Rd.) 8.5 mi E of Vass, plants abundant this locality, 10 Aug 1993, *R. Kral* 82960 (FSU, GH, MICH, MO, MSC, NCU, NY, VDB—site given by B. Sorrie from his earlier record!).

Thus we now have several records from five southeastern states of a plant which, up until late 1989, was known only from two specimens, sketchily documented, collected by Dr. Mohr from Mobile Co., Alabama, and thought by many to be quite possibly extinct.

Two Georgia sites for *R. crinipes* were collected by Dr. John Bozeman but not so identified. In 1990, doing loans kindly sent by NCU and GA I was able to find and annotate them: **GEORGIA.** **Appling Co.:** Big Satilla Creek swamp on GA 99 at Bacon Co. line S of Baxley, 9 Jun 1967, *J. Bozeman* 9313 (NCU). **Turner Co.:** Little River swamp on Co. Rd. S1989 S of Sycamore and 1.9 mi W of US 41 at Anaha, 15 Jun 1967, *J. Bozeman* 9720 (GA, NCU). Both are excellent examples and provided incentive to relocate the populations. Attempts in 1991, 1992, 1993, and 1994 however failed. It must be said that the two Bozeman localities had suffered since the 1960s from heavy and destructive logging both in their immediate vicinity and in the surrounding watershed. Also, in the years since 1991, the history of weather has been one of extreme flooding alternating with extreme drought and heat during the growing season, making it difficult to visit the sites at an optimum time. But the condition of the bottoms and banks of the two stream systems, disturbed as they are, lead me to suggest that these two populations are extirpated.



5. *Rhynchospora curtissii* Britton ex Small, Fl. SE U.S. 195. 1903.

*Phaeocephalum curtissii* House, Amer. Midl. Naturalist 6:201. 1920. *Rhynchospora filifolia* A.Gray var. *ellipsoidea* Kük., Bot. Jahrb. Syst. 75:107. 1950. TYPE: FLORIDA. SANTA ROSA CO.: moist roadside, Milton, *Curtiss* 5929 (HOLOTYPE: NY; ISOTYPES: G, NCU, US).

*R. fusca* sensu Fernald, Bot. Gaz. 24:433. 1897, non (L.) W.T. Aiton.

Densely cespitose, e-rhizomatous, perennial 1–3(–4.8) dm high. Culms filiform, ascending to excurved, subterete, coarsely few-costate ca. 0.3–0.4 mm thick, leafy toward and at base. Leaves erect to ascending or excurved, filiform, the principal ones mostly 1–2 dm, the narrow, conduplicate sheaths terete, multicostate, the scarious ventral side apically transverse, the blades few-nerved, 0.2–0.3 mm wide, at base strongly involute, upblade scarcely tapered, canaliculate, slightly compressed or 2-edged, blunt apically. Terminal and penultimate fascicles usually compound, mostly narrowly turbinate to ellipsoid or oval, open or dense, the lower ones simple, of few (–1) spikelets, subtending bract linear-setaceous, exceeding lower fascicles, mostly exceeded by, rarely longer than terminal fascicle; spikelets lanceoloid, red-brown, 4.5–7 mm, narrowly acute; fruiting bracts mostly 2–5, narrowly oblong-ovate or elliptic, 3–4.5 mm, acute, mostly convex, only the midcosta evident, this short-excurrent as mucro or aristula; stipe and receptacle short, 0.1–0.2 mm, setose; perianth of 6, antrorsely barbellate, basally pilose bristles 3–3.7 mm, extending well past tubercle tip; stamens 2, anthers linear, ca. 2 mm; fruit body lenticular, narrowly oblong-obovate, 1.2–1.5 mm

margined, apically transversely troughed at junction with raised tubercle base, faces lustrous brown around a paler, usually glassy central disc, very finely lined longitudinally transversely with wavy lines of fine pits; mature tubercle triangular or slightly concave-sided, edges setulose. Figure 6.

Moist to wet sands and peats of bog edges, pineland pondshores, seeps and pine-cypress savanna, Atlantic and Gulf Coastal Plain, locally abundant, eastern North Carolina intermittently south through South Carolina, Georgia to northern Florida, west to western Florida, southern Alabama and Mississippi. Figure 3.

This low, wispy sedge forms dense tussocks as do *R. rariflora*, *R. oligantha*, and like them seems to prefer the black fine sandy peats of frequently burned, unbroken pine savanna or shallow bogs in that type. Like *R. oligantha* it becomes more scarce as virgin savanna is converted to field or improved pasture. Habitally it most resembles *R. pleiantha* but of course lacks the rhizomes; ecologically however, it is in quite another system and borders more on habitat occupied by *R. harperi*, *R. filifolia* of the complex.

Specimens examined: As previously, I am citing only VDB vouchers and some recent distributions: U.S.A. FLORIDA: Bay Co.: 1/2 mi W Youngstown on exposed wet sands



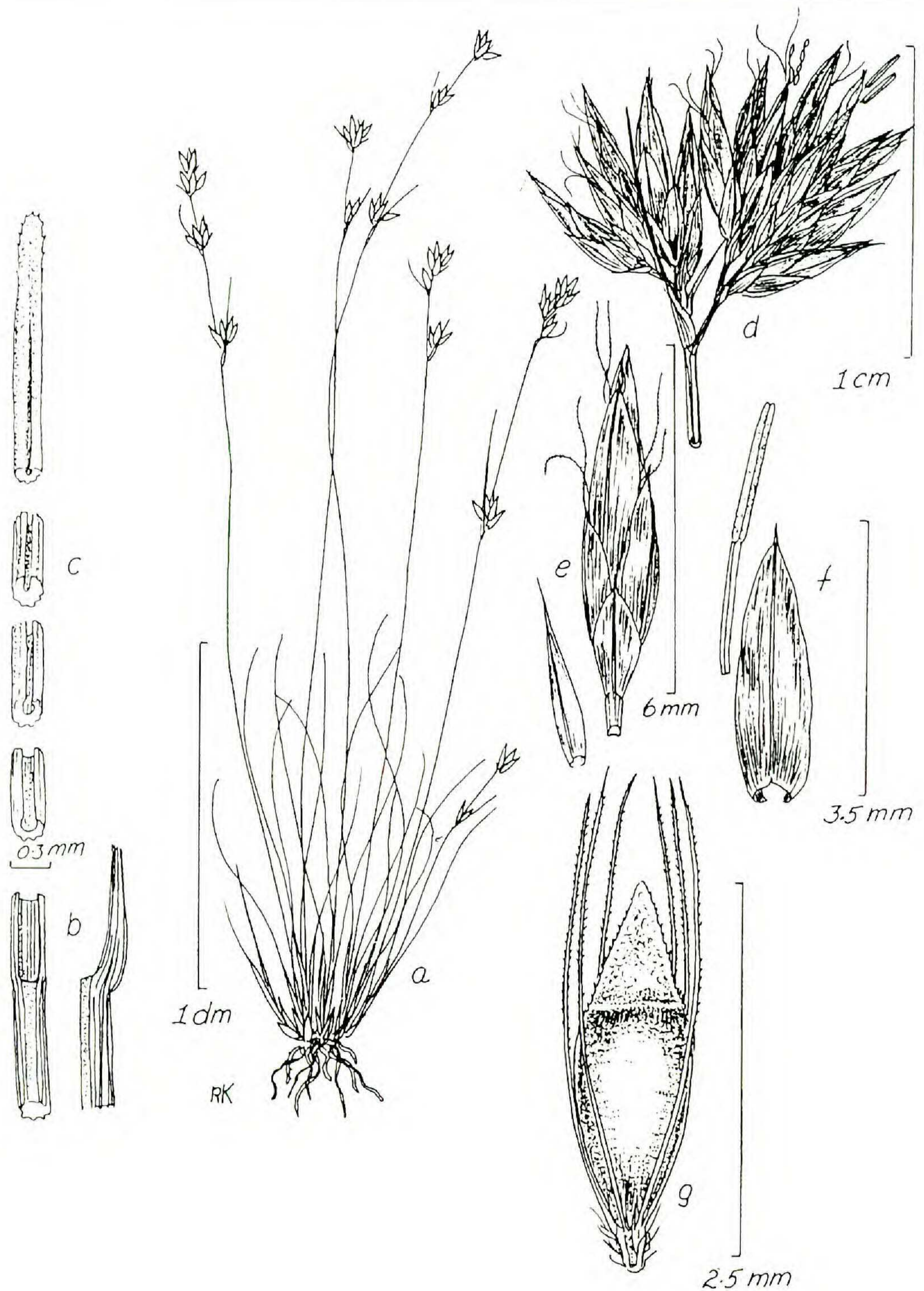


FIG. 6. *Rhynchospora curtissii* (Kral 7197). A. Habit sketch. B. Leaf sheath-blade junction, adaxial view (left), side view (right). C. Leaf blade sectors from base (bottom) to apex (top). D. Terminal fascicle complex. E. Spikelet with (left) subtending bract. F. Fertile scale, stamen apex with anther (right). G. Face view of mature fruit.



of seepage bog, 18 Aug 1962, *R. Kral 15665* (VDB). **Escambia Co.:** 1 miles S jct. US 90 and co 289A W of Pensacola; sandy peat of pine flatwoods, 7 Jul 1963, *R. Kral 17626* (VDB). **Franklin Co.:** 4.5 mi S on FL 65 from jct. with Fort Gadsden Creek, frequent, 31 May 1990, *S. & G. Jones 5127* (TAES, VDB); pine flatwoods, 3 mi N of Eastpoint, 21 Jun 1965, *R. K. Godfrey 65859* (FSU, VDB) sandy peat at edge of small cypress dome in scrub, end of shell road, East Point, ENE end of FL 65, 20 Jul 1993, *R. Kral 82845* with *G. Moore* (BRCH, MICH, OSC, PH, SMU, VDB). **Gulf Co.:** wet peaty soil at margin of gum pond, 7 mi S of Wewahitchka, 18 Jun 1958, *R.K. Godfrey 57091* (FSU, VDB); wet ditch, bordering pine flatwoods, 2.5 mi E of Port Saint Joe, 18 Jun 1958, *R.K. Godfrey 57120* (FSU, VDB); N side White City; sandy peat of clearing in slash pine-palmetto flatwoods, 27 May 1979, *R. Kral 63775* (VDB). **Liberty Co.:** sandy peaty soil, broad roadside ditch bordering pine flatwoods, 11.5 mi N of Sumatra, 14 Jun 1960, *R.K. Godfrey & J.N. Triplett 59802* (FSU, VDB); sandy peat of bulldozed cypress-pine, FL 65, Telogia (undisturbed portion), 3 Jul 1993, *R. Kral 82810* (CM, CTB, FSU, GA, GH, MBM, UNA, VDB). **Santa Rosa Co.:** common in wet sands of roadway across savanna, between I-10 and Milton, 24 Jul 1974, *R.K. Godfrey 73791* (FSU, VDB); sandy peat of pine savanna by FL 191 exit off I-10 (Bagdad Exit), 29 Jun 1991, *R. Kral 79282* (VDB & distribution); pine and cypress flats along Yellow River W of FL 87, N of Holley & S of I-10, sandy peat of wet savanna-like area, 27 Aug 1991, *R. Kral 79782* (VDB & distribution); 4.5 mi E of Gulf Breeze, common on moist pine savanna, 11 Oct 1963, *S. McDaniel 3862* (FSU, VDB). **Wakulla Co.:** sandy-peaty ditch bordering pine flatwoods, St. marks Wildlife Refuge, between Sopchoppy and Panacea, 9 Jun 1960, *R.K. Godfrey 59705* (FSU, VDB); mesic longleaf pine / wiregrass - saw palmetto savanna on SW side of FS Rd 314-I at int of FS Rd 314-H, ca 0.4 mi NW int FH 13 at ca 2.4 mi NE of int FL 375, ca 1.6 mi NE of Smith Creek School, Apalachicola NF, 24 Jun 1990, *S.R. Orzell & E.L. Bridges* (TEX, VDB). **Walton Co.:** sandy peat of hillside seep in longleaf pine by FL 20, ca 7 mi W of Ebro, 29 Jun 1991, *R. Kral 79290* (VDB & distribution). **Washington Co.:** N side of FL 20, 6.5 mi E of Ebro; sandy peat of low pine savanna, cypress-pine-titi, 26 Aug 1995, *R. Kral 85623* (BM, CM, GH, K, MICH, MSC, NCU, NY, OS, VDB).

**6. *Rhynchospora filifolia* A. Gray** in Torrey, Ann. Lyceum Nat. Hist. New York 3:366. 1836. *Phaeocephalum filifolium* (Gray) House, Amer. Midl. Naturalist 181. 1920. TYPE: U.S.A. NORTH CAROLINA [without county, annotated in Gray's hand (HOLOTYPE: NY, lectotypified by Gale (1944))].

Cespitose e-rhizomatous perennial (1–)2–8(–10) dm high. Culms filiform, wiry, mostly excurved or arching, obtuseangled to subterete, 0.3–0.7(–1.2) mm thick, coarsely few-costate, leafiest at and toward base. Leaves erect, ascending or excurved, principal ones 1–ca. 2 dm long, blades filiform, mostly 0.2–0.5 mm wide (broadest ones actually bracteal and to 2 mm wide), proximally flattened or broadly “V”-shaped to slightly involute, finely nerved but with midcosta strongly raised abaxially, upblade strongly narrowed, progressively more deeply canaliculate and filiform, becoming unisulcate, thickened, the very apex thick, blunt, but with scabrid edges. Fascicles of spikelets mostly compound, 1–3(–4), sparse to dense, narrowly turbinate or even short-cylindric to hemispheric, often lobed, 0.7–1.5 x 0.7–1.5 cm, the terminal one well exceeded by at least 1 subulate-setaceous bract, the lower ones progressively longer peduncled, peduncles erect



or excurved, subtended by progressively longer, leafier bracts. Spikelets ovoid to lanceoloid, 2.5–3.5 mm, narrowly acute; scales several, the fertile ones 2–3(–4), ovate, 2–2.5 mm, acute, convex, only the strong midcosta evident, this usually excurrent as a mucro or arista; stipe and receptacle stout, ca. 0.2–0.3 mm, sparsely to densely setose and setulose; perianth of 6 antrorsely scabrid bristles 1.5–2 mm long; fruit body mostly broadly obovoid, 0.8–1 mm, lenticular, margined, faces light to deep brown, lustrous, finely longitudinally lined, sometimes very finely cancellate and with wavy lines of small pits, but always with a strongly contrasting pale, glassy center; tubercle triangular 0.5–0.7 mm, its edges variably setulose-scabrid, base shallowly lunate, slightly decurrent. Figure 7.

Moist to wet sands, sandy peats or peat of grass-sedge meadow, pine savanna, seeps and bogs, pondshores, ditches, streambanks and bars, pine flatwoods, Atlantic and Gulf Coastal Plain, and contiguous physiology, New Jersey south to southern Florida, then westward to eastern Texas; Greater Antilles, Mesoamerica. Figure 8.

This species is the most ample ecologically of the species treated here, which doubtless explains its highly variable habit as well as its occurrence within the habitat of all of these taxa. But as regards its inflorescence, inflorescence bracts, spikelet color and dimension, perianth and fruit the many hundreds of specimens examined in this study are remarkably consistent; the bracts consistently exceed inflorescences; the spikelets are the shortest, often of broadest outline but with fewer fertile scales, these the shortest and broadest in outline; the fruit bodies are the shortest, distinctly the smoothest, always with the glassy pale central “disc” on each face. It is, as one would suspect, the weediest of the species, is a quick invader of disturbed wetland sites so long as they remain undrained. Sometimes, in a single savanna in southern Alabama or northern Florida, it can present a considerable range of morphs, the moister or shadier situations having the taller, broader-leaved individuals, the more exposed or slightly drier sites with the shorter, narrower culmed-and-leaved individuals, these also often with the more sparsely spikeleted fascicles.

A review of the literature available on *R. filifolia* if followed by an examination of many specimens over the range, will show that Dr. Gale’s taxonomic disposition appears to be closer to the real situation than is that of Dr. Kükenthal.

Since even a recording of specimens available here at VDB would be very lengthy, and since this distinctive species varies so little as to key characters, complete citations are not included here. Duplicates of many of my sets have been distributed as follows:

Representative specimens: U.S.A. ALABAMA. Baldwin Co.: *Kral 85310* (APSU, BM, CM, CTB, F, FLAS, FSU, GA, GH, K, MICH, VDB). Covington Co.: *Kral 84588* (BRCH,



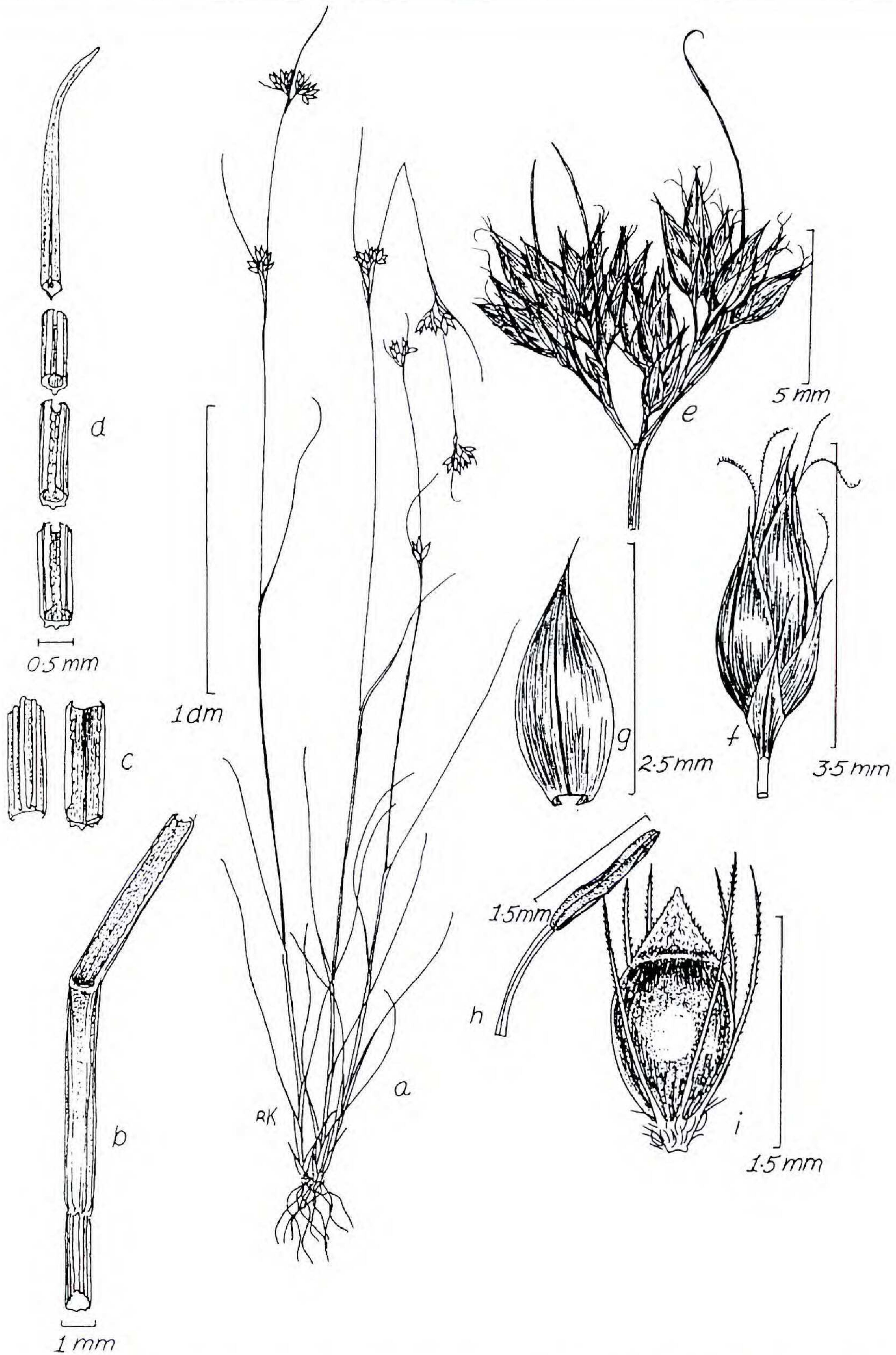


FIG. 7. *Rhynchospora filifolia* (Kral 39457, 79671). A. Habit sketch. B. Leaf sheath-blade junction, adaxial side. C. Leaf blade base sectors, abaxial side (left), adaxial side (right). D. Sectors of leaf blade, proximal end (bottom) to apex (top). E. Terminal spikelet complex. F. Spikelet. G. Fertile bract. H.—Filament apex with anther. I. Face view of mature fruit.



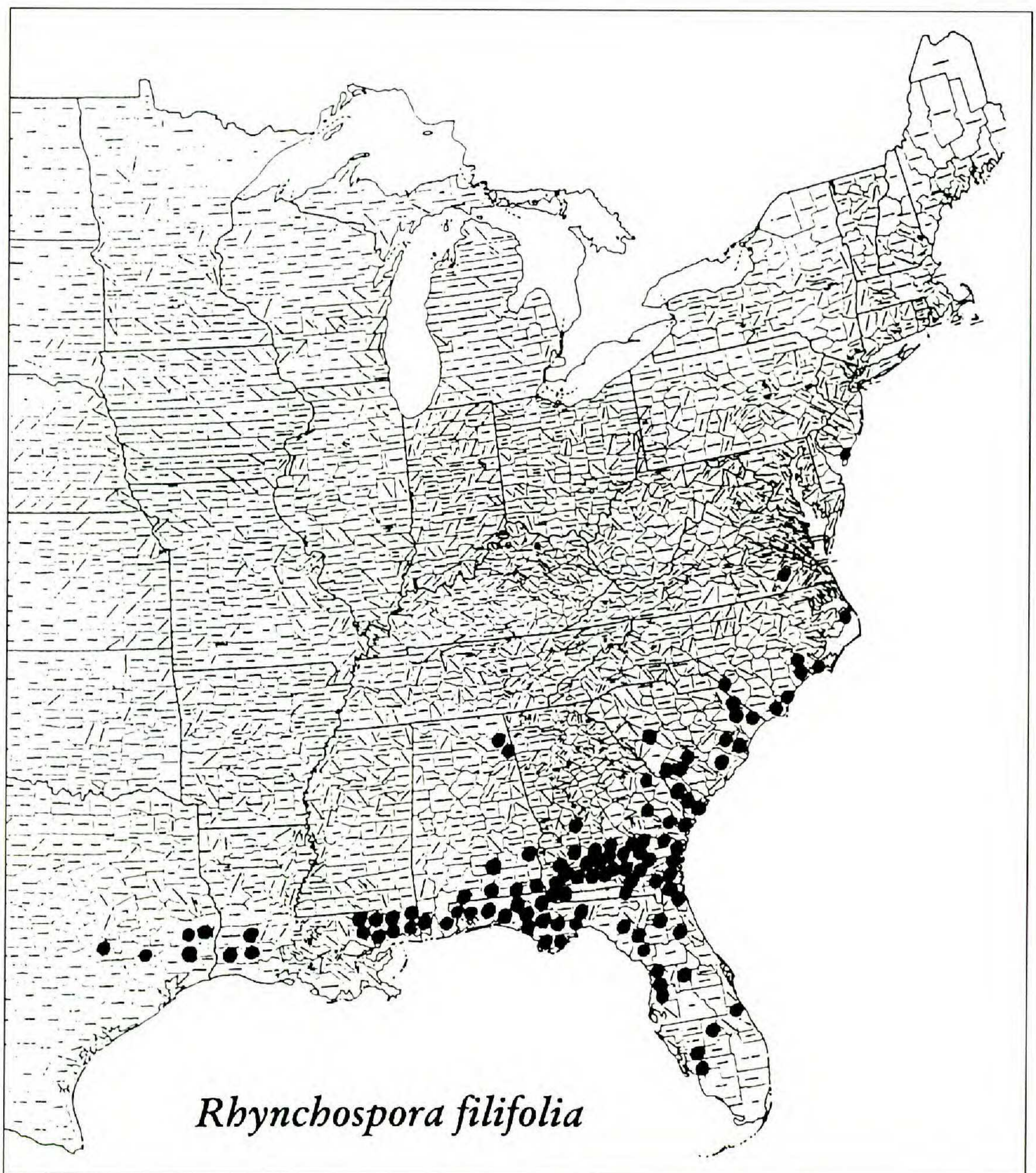


FIG. 8. Distribution of *Rhynchospora filifolia* in the southeastern United States.

NY, OS, TEX, VDB). Crenshaw Co.: *Kral* 82940 (NLU, NY, SMU, UNA, VDB). Escambia Co.: *Kral* 84913 (MO, MSC, MU, VDB). Geneva Co.: *Kral* 81167 (GH, MO, VDB); *Kral* 84859 (FSU, USCH, VDB). Houston Co.: *Kral* 81156 (BRCH, NY, SMU, VDB); 81111 (BRCH, MO, NY, SMU, VDB); 81131 (CTB, GH, VDB). Mobile Co.: *Kral* 81493 (GH, VDB); 81488 (FSU, MSC); 81469 (GH, KANU, MICH, MO, TENN, VDB). FLORIDA. Bay Co.: *Kral* 82862 (GH, IBE, MICH, MO, VDB); 84613 (BRCH, TEX, VDB, VPI); 84616 (FLAS, FSU, GA, GH, K, MICH, MO, MSC, MU, NCU, NY, OS, VDB); 84617 (APSU, BM, CM, CTB, F). Franklin Co.: *Kral* 82801 (BRCH, CM, CTB, GA, GH, IBE, MBM, MICH, MO, NCS, NCU, NLU, NY, SMU, TENN, VDB); 82880 (GH, MO, SMU, VSC). Gulf Co.: *Kral* 82854B (IBE, SMU); 84605 (FSU, GH, K, MO, USCH, VDB). Okaloosa Co.: *Kral* 84563 (MSC, MU, NCU, NY, VDB). Wakulla Co.: *Kral* 82763 (CM, CTB, GA, VDB). Washington Co.: *Kral* 82839 (CM, CTB, UNA,



VDB). GEORGIA. Appling Co.: *Kral* 83127 (CM, GA, MO, NCU, NLU, NY, VDB). Bacon Co.: *Kral* 82714 (CM, CTB, FSU, GA, GH, IBE, MICH, MO, NCU, NY, SMU, VDB). Ben Hill Co.: *Kral* 83970 (NCU, VDB). Berrien Co.: *Kral* 80706 (CTB, GH, TENN, VDB). Emanuel Co.: *Kral* 85460 (BRCH, TEX, USCH, VDB). Glynn Co.: *Kral* 83081 (GA, GH, MICH, MO, TENN, VDB). Irwin Co.: *Kral* 80920 (GH, MO, VDB). Jeff Davies Co.: *Kral* 83181 (GA, GH, MBM). Long Co.: *Kral* 83105 (GA, GH, SMU, VDB). McIntosh Co.: *Kral* 83064 (GA, GH, VDB). Tift Co.: *Kral* 80893 (GH, VDB, VSC). Turner Co.: *Kral* 82684 (GA, MO, VDB). LOUISIANA. Washington Par.: *Kral* 84947 (GH, MO, NY, OS). MISSISSIPPI. Jackson Co.: *Kral* 81432 (GH, VDB); 81457 (BRCH, CH, CTB, FSU, GA, GH, KANU, MICH, MISSA, MO, MU, NY, OSH, SMU, TENN, VDB, VSC, WIS); 81460 (GA, MO, VDB); 81461 (BRCH, MU, OSH, SMU, VDB, WIS) 84963 (TEX, VDB, VPI, VSC; 84940 (GH, VDB); 85302 (GH, MICH, MO, VDB). Pearl River Co.: *Kral* 85279 (MICH, MO). SOUTH CAROLINA. Berkeley Co.: *Kral* 83028 (BRCH, FSU, VDB); 83031 (IBE, MICH, MO, NCS, NCU, VDB)

## ACKNOWLEDGMENTS

My own interest in *Rhynchospora* dates from trying to make sense of my collections of such plants in Alabama so as to do a reasonable treatment for that State Flora. The "courage of my confusions" (to paraphrase from Lyman Benson) led to a yet unpublished treatment, further to undertaking to do the genus for FNA, this since the early 1990s in the hands of those editors. In the course of such work curators and staffs of the following institutions (cited by acronym) were kind to extend loans or to allow visits: A, BRIT-SMU BH, CTB, FSU, GH, KANU, MICH, MO, MU, NCU, NLU, NY, RM, SD, TAES, TEX, UC, US, USC, USCH, VKPI, VSC, WILLI. Such aid is gratefully acknowledged as is that from others knowledgeable in the genus such as Dr. C.T. Bryson, Dr. R.K. Godfrey, Richard LeBlond and Bruce A. Sorrie. Fieldwork on the genus and on *R. crinipes* in particular was in large part supported through a contract to do a status survey of *Rhynchospora crinipes* awarded beginning 1990 through the kindness of Ms. Cary Norquist of the Jackson Mississippi office, U.S. Department of the Interior, and administered by Mr. Scott C. Gunn and subsequently by Ms. Jarel T. Hilton of the Alabama Natural Heritage Program, Montgomery. The final draft of the *R. crinipes* status report was submitted October 1995.

## REFERENCES

- ANDERSON, L.C. 1988. Status of endangered *Rhynchospora crinipes* (Cyperaceae). *Syst. Bot.* 13:405–410.
- GALE, S. 1944. *Rhynchospora* sect. *Eurhynchospora* in Canada, the United States and the West Indies. *Rhodora* 46:80–134, 159–197, 255–278.
- KRAL, R. 1983. *Rhynchospora crinipes* Gale, in A report on some rare, threatened, or endangered forest-related vascular plants of the South. Vol. 1: Paper 169: 13–136. U.S.D.A. Forest Service Tech. Publ. RB-TP-2.
- KÜKENTHAL, G. 1950. *Bot. Jahrb.* 75(1):90–126.
- LITTLE, E.L. 1971. Atlas of United States trees, Vol. I. Conifers and important hardwoods, U.S.D.A. Misc. Publ. 1146. Map 11-E, *Chamaecyparis thyoides* (L.) B.S.P.